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ABSTRACT

This publication is designed to provide assistance to local school districts in Illinois in meeting two new requirements: (1) to submit objectives for student learning to the State Board of Education which meet or exceed the State Goals for Learning and (2) to identify local goals for excellence in education. School districts have the option to adopt or adapt these objectives for local use or to develop a completely different set which is consistent with state goals but based on their view of local needs and conditions. The state goals are stated in broad, general terms so that districts have a large degree of latitude in developing instructional strategies and objectives that reflect local considerations. The seven goals are listed in Section II. In Section III the goals are again listed, along with the general knowledge and skills related to each goal. Section IV contains the sample learning objectives for grades 3, 6, 8, 10, and 12 related to each goal and keyed to the general knowledge and skills areas. Included in the Appendix are the State Goals for Learning for all six fundamental areas of learning, plus answers to some of the most frequently asked questions about this program. (MNS)

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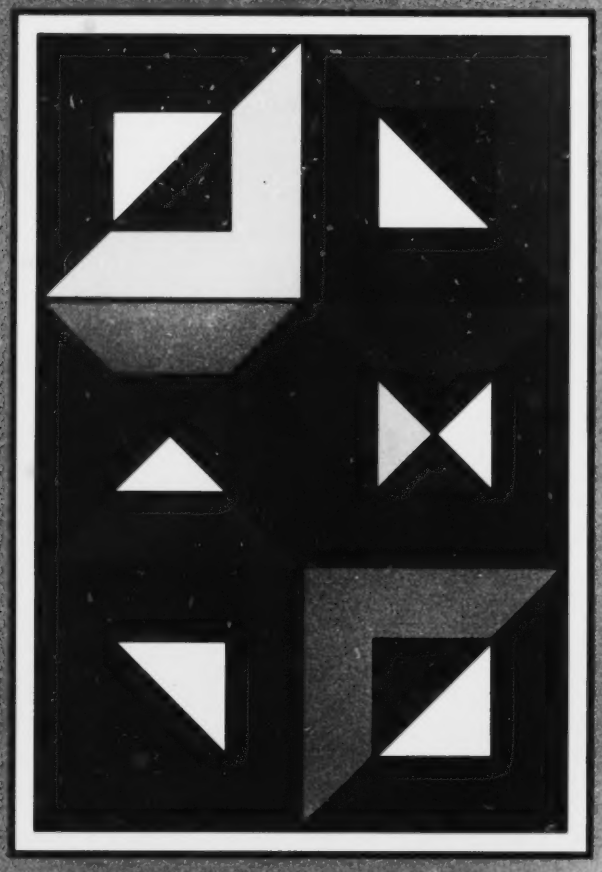
STATE GOALS FOR LEARNING

AND SAMPLE LEARNING OBJECTIVES



MATHEMATICS

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STATE GOALS FOR LEARNING

AND SAMPLE LEARNING OBJECTIVES

MATHEMATICS

GRADES 3, 6, 8, 10, 12

Illinois State Board of Education
Department of School Improvement Services

Walter W. Naumer, Jr., Chairman
Illinois State Board of Education

Ted Sanders
State Superintendent of Education

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INTRODUCTION

The 1985 educational reform legislation addressed nearly every aspect of schooling and provided a unique opportunity for local school districts and the State Board of Education to work cooperatively to improve education in Illinois. One of the most important pieces of the legislation, one which has long-range implications for learning and teaching in Illinois schools, provides for the development of learning goals and assessment systems at both the state and local levels.

Legislative Requirements

Public Act 84-126, effective August 1, 1985, amended The School Code of Illinois to include, for the first time in the state's history, a definition of schooling and a requirement that the goals for learning be identified and assessed. Specifically, the law requires the following:

The State Board of Education must establish goals consistent with the primary purpose of schooling. The legislation defines the primary purpose of schooling as the transmission of knowledge and culture through which children learn in areas necessary to their continuing development: language arts, mathematics, biological and physical sciences, social sciences, fine arts, and physical development and health.

Local school districts must establish student learning objectives which are consistent with the primary purpose of schooling and which meet or exceed goals established by the State Board.

School districts must also establish local goals for excellence in education.

The State Board must establish assessment procedures for local school districts. This includes the establishment of a common month for testing in each school year, the development of state test items to be included along with each of the district assessments, and the development of model assessment procedures which school districts may elect to use.

School districts must assess student learning to determine the degree to which local goals and objectives are being met. This assessment is required at least at grades 3, 6, 8 and 10, with the initial year for assessment staggered according to learning area and grade level.

School districts must develop local plans for improvement in those areas where local goals and objectives are not being met.

School districts must disseminate the local goals and objectives to the public, along with information on the degree to which they are being achieved and, if not, what appropriate corrective actions are being taken by the district.

The State Board must approve the local school district objectives, assessment systems, plans for improvement, and public reporting procedures.

The intent of these requirements is to put into place a system which will assure, to the maximum extent possible, that elementary and secondary school students learn what the state and local communities regard as important.

Purpose of this Publication

During the next several years, beginning in 1987, school districts will be required to submit their objectives for student learning to the State Board of Education. These objectives must meet or exceed the State Goals for Learning and must also identify local goals for excellence in education. The purpose of this publication is to provide assistance to local school districts in fulfilling these requirements.

This document is part of a series of six publications, one for each of the primary learning areas stated in the law. It identifies State Goals for Learning in a specific learning area* and a sample set of district-level learning objectives which are in our view consistent with those Goals. School districts have the option to adopt or adapt these objectives for local use or to develop a completely different set which is consistent with State Goals and is based on their view of local needs and conditions.

State Goals for Learning vs. District-Level Learning Objectives

The legislation adopted in the summer of 1985 required the State Board of Education to adopt State Goals for Learning in each of the six primary areas identified in law: language arts, mathematics, biological and physical sciences, social sciences, fine arts, and physical development and health. With the assistance of a committee chaired by Dr. John Corbally and representatives of education, business and the general public, the State Board completed this task in October 1985.

The State Goals for Learning are broadly stated, relatively timeless expressions of what the State of Illinois wants and expects its students to know and be able to do as a consequence of their elementary and secondary schooling. They are terminal goals--that is, they identify what students are expected to know by the time they complete their elementary and secondary

* State Goals for Learning in all six learning areas are found in Appendix A.

education. The state's interest is focused less on when or how the desired knowledge and skills are acquired than on the ultimate results of local efforts. Therefore, each local school district will be given the maximum flexibility allowed by law for deciding when and how they wish to approach the teaching of various skills and understandings.

The State Goals for Learning should not be confused with graduation requirements; they are statements of the expectations which are held for all Illinois students. Some students will far exceed them. Others may not achieve them initially, but that reality should not lessen the expectations or the efforts expended on improving their performance. Local schools will be expected to adjust programs and allocate resources in a manner which is consistent with achievement of the desired level of student learning.

Local school districts are required to develop, and submit for approval by the State Board of Education, local learning objectives which meet or exceed the State Goals for Learning. These district-level objectives will identify the learning outcomes expected for students in their schools and are, in effect, the district goals for learning.

Like the State Goals for Learning, district-level objectives are intended to represent terminal goals for elementary and secondary schooling. This means that the process of developing district-level objectives should begin with the identification of objectives which define the learnings expected of students by the time they complete schooling. These then become the framework within which a school district identifies the progression of learning for its students.

It should be emphasized that because the State Goals for Learning represent end-point expectations, it will be necessary for elementary and secondary schools to be in close communication during the development of local district objectives.

Sample Learning Objectives

The sample set of district-level learning objectives presented in this publication was developed as a means of providing assistance to districts in the development of their own objectives.

The State Goals for Learning were deliberately stated in broad, general terms so that districts would have a large degree of latitude in developing instructional strategies and having their objectives reflect such local considerations. These sample district-level objectives provide one of the many possible sets of objectives which are consistent with the State Goals for Learning. Districts could choose to adopt these sample objectives as their own, although we would assume that none would do so without due consideration of local conditions and needs and an appropriate process of thoughtful review. Districts could also adapt these sample objectives to correspond to their own views. The approach we suggest is for school districts to use this sample set of learning objectives as a guide to assist them in their efforts to develop local district learning objectives.

This sample set of district-level learning objectives was developed with the assistance of an expanded version of the committee which helped to develop the State Goals for Learning and a technical writing committee. A draft document was provided to school districts in the spring of 1986, and after an intensive period of review and analysis, revisions were made. This final version represents the perceptions and comments of many thousands of Illinois citizens and educators.

The sample learning objectives for grades 3, 6, 8, 10 and 12 describe learnings which are in our view consistent with the State Goals for Learning. Although these sample objectives identify specific expectations, district objectives for grades 3, 6, 8, and 10 do not necessarily have to correspond. State Board approval of local objectives will be based on compatibility with the State Goals for Learning, not these sample objectives.

Some additional comments about what these sample district-level learning objectives are, and are not, intended to do.

1. They are not intended to specify instructional delivery systems. Although the objectives are listed in fundamental learning areas closely related to traditional course offerings or specific areas of the curriculum, it should be emphasized that the learnings can appropriately occur in a number of places in the curriculum. The focus is on student learning, not course offerings. Naturally, a student must have opportunities to learn the knowledge indicated or the skill specified in the objectives, but such activities do not of necessity have to occur within the learning area in which it is listed.

2. The number of sample learning objectives shown for a particular learning area is not intended to suggest the relative amount of instructional time which should be given to that area. Time allocations will vary for a variety of reasons totally unconnected to the length of a list of objectives.

3. The sample learning objectives identify behavior or knowledge in more general terms than those expected to be used in local district instructional objectives. The establishment of definitions at that more specific level is left to local discretion.

4. The sample objectives are intended to reflect a progression of learning which is consistent with learning theory and human development. Wherever possible, the sample objectives present a range of cognitive levels within a grade level. Learning sequences generally emphasize higher cognitive levels as grade levels increase from grade 3 to grade 12. However, some learning objectives remain the same from grade to grade--that is, objectives do not present a cognitive sequence that increases in difficulty across grade levels. Rather, these objectives imply an increase in the complexity and sophistication of learning materials and other stimuli appropriate to the developmental stage of the student.

5. The samples presented in this document do not cover all possible cognitive levels and learning sequences necessary for effective teaching and instruction. However, the samples are intended to present a broad picture of the knowledge and skills which meet the State Goals for Learning, without specifying the instructional activities necessary to achieve these learnings.

6. The sample learning objectives are not intended to reflect measures of student achievement or to prescribe instructional methods. Local curricular and instructional designs, course offerings, textbooks and materials, and other adjuncts to teaching and learning are determined locally. This Learning Outcome/Assessment program will not change that practice.

7. Although the State Goals for Learning and the sample learning objectives are identified within a specific area of learning, it is hoped that as local school districts develop their own objectives, they will consider the need to assure that students integrate knowledge and understand the interrelationships of the learning areas.

8. Although each district's objectives will serve as the basis for its district-level assessment program, these sample learning objectives are not the framework or basis for state assessment items. State assessment will be based on the more general areas defined in the State Goals for Learning.

Publication Format

In this publication, all of the State Learning Goals for this fundamental area of learning are listed in Section II. In Section III, the State Goals are listed with the general knowledge and skills which are related to each goal.

Section IV contains the sample learning objectives related to each Goal and keyed to the general knowledge and skills areas. The capital letter before each objective refers to the general knowledge and skills area. The objectives are numbered consecutively by each area. For example, sample learning objective D2 relates to the general knowledge and skills statement D and is the second sample objective listed for this grade level in this area. In this way, districts can reconstruct the progression used in developing the sample learning objectives. Each grade designation of sample learning objectives begins on a separate page so that all of the sample learning objectives for a particular level can be aggregrated.

Included in the Appendix are the State Goals for Learning for all of the six fundamental areas of learning and answers to some of the most frequently asked questions about this program.

Mathematics

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MATHEMATICS

The sample learning objectives for the seven State Goals for Learning in mathematics presented in this publication provide one way which these goals might be viewed at grades three, six, eight, ten, and twelve. In defining the content of these objectives, the following national and state reports in mathematics, science and technology were heavily relied upon: The National Science Board Report, Educating Americans for the 21st Century; The National Council of Teachers of Mathematics, Agenda for Action; The National Council of Supervisors of Mathematics, "Position Paper on Basic Skills"; The College Board Reports, Academic Preparation for College: What Students Need to Know and Be Able to Do and Academic Preparation for the World of Work; The Illinois State Board of Education, "New Thrusts in Illinois School Mathematics."

In addition, the comments about content made by participants in the leadership conferences cosponsored by the State Board and by the Illinois Council of Teachers of Mathematics in 1984 and 1985 were analyzed. These conferences reviewed the "New Thrusts" document which heralded many of the new content themes which appear in these objectives. The preliminary results of the Second International Study of Mathematics Achievement, current research on Soviet and Japanese mathematics education, and the results of the Illinois Inventory of Educational Progress tests in mathematics were reviewed, as were the curricular sequences and objectives developed in states as varied as California, Wisconsin, Georgia, Texas, Alaska, and Oklahoma. The identification of vital knowledge, processes and skills in mathematics is a dynamic process and must be reviewed continually to enable the process to reflect new and changing needs.

Readers of this document will recognize topics long felt to be central to elementary and secondary mathematics such as arithmetic skills, percent, ratio and proportion, measurement, and elementary algebra. However, all of the state and national reports reviewed reflect a broader concept of what is basic in mathematics. This document gives strong attention at all grade levels to topics which extend the usefulness of school mathematics: problem solving, increased use of technology, concepts of elementary statistics and probability, real-life applications, geometric concepts and skills, and estimation and mental mathematics.

These objectives define what students should know and be able to do in mathematics by the end of the indicated grade level. The objectives at the twelfth grade speak to the mathematical knowledge that students are expected to carry away from their study of mathematics at the end of secondary school.

MATHEMATICS

Mathematics provides essential problem-solving tools applicable to a range of scientific disciplines, business, and everyday situations. Mathematics is the language of quantification and logic; its elements are symbols, structures, and shapes. It enables people to understand and use facts, definitions, and symbols in a coherent and systematic way in order to reason deductively and to solve problems.

State Goals for Learning

As a result of their schooling, students will be able to:

- perform the computations of addition, subtraction, multiplication, and division using whole numbers, integers, fractions and decimals;
- understand and use ratios and percentages;
- make and use measurements, including those of area and volume;
- identify, analyze and solve problems using algebraic equations, inequalities, functions and their graphs;
- understand and apply geometric concepts and relations in a variety of forms;
- understand and use methods of data collection and analysis, including tables, charts and comparisons;
- use mathematical skills to estimate, approximate and predict outcomes and to judge reasonableness of results.

MATHEMATICS

STATE GOAL FOR LEARNING 1

As a result of their schooling, students will be able to perform the computations of addition, subtraction, multiplication, and division using whole numbers, integers, fractions, and decimals.

Computational skills prepare a student to use the symbols of the number system, the concepts, the processes, and the tools of mathematics (calculators, computers, etc.) to solve problems in real-life situations. These skills also provide a basis for further study in mathematics. Students should be able to perform some skills MENTALLY, do some with PAPER AND PENCIL, and do some using the appropriate TECHNOLOGY.

GENERAL KNOWLEDGE/SKILLS RELATED TO GOAL 1

The following knowledge, processes, and skills are related to this State Goal for Learning:

A Ability to read, write and name numbers in several different ways.

B Ability to perform operations with numbers with and without a calculator.

C Ability to translate word problem situations to mathematical expressions or sentences and solve the sentences.

D Ordering numbers.

E Application of properties of numbers and operations.

F Use of exponents, powers, and roots.

G Use of factors and multiples.

H Application of computational and problem-solving skills to common life situations with or without calculators.

I Use of number patterns.

STATE GOAL FOR LEARNING 2

As a result of their schooling, students will be able to understand and use ratios and percentages.

Ratios, proportions, and percents are means for comparing and analyzing quantitative relationships. Practicing these techniques with real-life situations will hasten routine use.

GENERAL KNOWLEDGE/SKILLS RELATED TO GOAL 2

The following knowledge, processes, and skills are related to this State Goal for Learning:

A Interpretation of ratios.

B Construction and solution of proportions.

C Application of ratios and proportions to real-life situations.

D Interpretation of percents in various settings.

E Application of percents in real-life situations.

STATE GOAL FOR LEARNING 3

As a result of their schooling, students will be able to make and use measurements, including those of area and volume.

Measurement is the process of systematically associating numbers with objects and actions. Familiarity with common systems (metric and customary) and instruments of measurement is basic to an understanding of our world.

GENERAL KNOWLEDGE/SKILLS RELATED TO GOAL 3

The following knowledge, processes, and skills are related to this State Goal for Learning:

A Measurement in various contexts using appropriate units.

B Estimation of measurements.

C Relating lengths, areas, and volumes in common geometric figures.

D Conversion of units within one system and from one system to another.

E Application of selected measurement systems, instruments, and techniques.

STATE GOAL FOR LEARNING 4

As a result of their schooling, students will be able to identify, analyze and solve problems using algebraic equations, inequalities, functions and their graphs.

Algebra is the study of number patterns and their expressions in symbolic and graphical forms. The concepts of variables, powers, equations, inequalities, functions, and graphs provide a framework and basic tools for representing and solving social, physical, medical, scientific, and economic problems in quantitative terms. As such, algebraic thinking contributes to the understanding of everyday situations across the mathematics curriculum.

GENERAL KNOWLEDGE/SKILLS RELATED TO GOAL 4

The following knowledge, processes, and skills are related to this State Goal for Learning:

A Use of expressions, equations, or inequalities to describe general patterns.

B Ability to solve simple equations and inequalities and interpret the solutions.

C Translation of verbal descriptions into algebraic expressions, equations, or inequalities and vice versa.

D Ability to evaluate, solve, and apply formulas with and without calculators.

E Application of various techniques of graphing.

F Ability to perform operations with algebraic expressions.

G Interpretation of functions and their graphs.

STATE GOAL FOR LEARNING 5

As a result of their schooling, students will be able to understand and apply geometric concepts and relations in a variety of forms.

The study of geometry is the study of size, shape, and position. It promotes a deeper awareness and understanding of the real world and contributes to the attainment of important problem-solving processes such as exploring, conjecturing, testing, confirming, and refuting. It also provides opportunities for students to examine the processes of defining, classifying, and deducing. The study of geometry is not only fundamental to a full understanding of mathematics for the scientifically oriented, but it is also fundamental for the understanding of real-world situations by the general population. As such the concepts of geometry are essential for all students at all grade levels, not just for the college-bound student in high school.

GENERAL KNOWLEDGE/SKILLS RELATED TO GOAL 5

The following knowledge, processes, and skills are related to this State Goal for Learning:

A Simple geometric figures and patterns of relationships in two and three dimensions.

B Application of symmetry and transformations.

C Application of concepts of congruence and similarity.

D Application of the Pythagorean Theorem and common right triangle relationships.

E Definition of common geometric figures and methods of using deductive reasoning to relate properties of those figures.

STATE GOAL FOR LEARNING 6

As a result of their schooling, students will be able to understand and use methods of data collection and analysis, including tables, charts and comparisons.

The collecting, organizing, and analyzing of information for making predictions and inferences constitute the basis for an understanding of statistics. The results of data analyses communicate patterns, relationships, and trends. Although these skills and knowledges are listed in the learning area of mathematics, they might be learned and/or reinforced in other learning areas such as the social sciences and the biological and physical sciences.

GENERAL KNOWLEDGE/SKILLS RELATED TO GOAL 6

The following knowledge, processes, and skills are related to this State Goal for Learning:

A Interpretation of data from an experiment.

B Ability to estimate probabilities from experiments or from data.

C Application of probabilities to predict or forecast results of experiments and events.

D Computation of probabilities of selected events.

E Interpretation of tables, graphs, charts, arrays, schedules, experiments, and surveys reported in media sources.

F Construction of tables and graphs to indicate selected trends or relationships.

G Commonly used summary statistics.

H Ability to design and conduct an experiment or survey using sampling.

I Ability to design and conduct a simulation to gain information about a problem.

STATE GOAL FOR LEARNING 7

As a result of their schooling, students will be able to use mathematics skills to estimate, approximate, and predict outcomes and to judge reasonableness of results.

In many situations, exact values are impossible, unrealistic, or unnecessary to obtain. Estimation is the process by which one obtains a reasonable value in such situations. The procedures of estimation are partners of the procedures which give exact answers: careful reasoning and problem-solving strategies. The strategies of problem solving remain fairly constant across developmental levels. Consequently, some of the objectives related to this area will remain the same with increasing complexity at higher grade levels. Estimation procedures may be done mentally, with paper and pencil, or with calculator and computer.

GENERAL KNOWLEDGE/SKILLS RELATED TO GOAL 7

The following knowledge, processes, and skills are related to this State Goal for Learning:

A Rounding numbers.

B Estimation of present and future values from graphs or numerical information.

C Application of intervals as estimates.

D Ability to determine whether an estimate is a better alternative than an exact value.

E Ability to determine what conclusions are valid from a given set of information.

F Appropriate application of words of quantification.

G Application of problem-solving procedures to solve or suggest a solution to a given problem.

H Use of mental arithmetic to estimate results of computations.

MATHEMATICS
GRADE 3

STATE GOAL FOR LEARNING 1

As a result of their schooling, students will be able to perform the computations of addition, subtraction, multiplication, and division using whole numbers, integers, fractions, and decimals.

SAMPLE LEARNING OBJECTIVES FOR GOAL 1

By the end of GRADE 3, students should be able to:

A1. Write words for whole numbers up to 4 digits.

A2. Read 7-digit whole numbers.

A3. Translate whole numbers from spoken words to numerals up to 5 digits.

A4. Identify a part of a unit whole or group as a fraction.

A5. Translate fractions which have a numerator of 1 from words to symbols.

B1. Relate whole numbers to points on a number line and vice versa.

B2. Add and subtract mentally 2-digit multiples of 10.

B3. Add whole numbers up to 3 digits without a calculator.

B4. Subtract whole numbers up to 3 digits without a calculator.

B5. Add or subtract whole numbers up to 6 digits with a calculator.

B6. Multiply a 2-digit number by a 1-digit number without a calculator.

B7. Multiply 2 numbers with the product up to six digits using a calculator.

B8. Divide a 2-digit number by a 1-digit factor without a calculator.

B9. Divide a whole number of up to 6 digits by a factor of up to 3 digits using a calculator.

C1. Translate putting-together addition situations involving whole numbers into number expressions or sentences and solve and vice versa. (Example: Rob has 8 apples and Gail has 4 apples. How many apples do they have together?)

C2. Translate add-on addition situations involving whole numbers into number expressions or sentences and solve and vice versa. (Example: If Joe is 105 cm tall and grows another 5 cm in height, what is Joe's new height?)

C3. Translate take-away subtraction situations involving whole numbers into number expressions or sentences and solve and vice versa.

C4. Translate part-part-whole situations involving whole numbers into number expressions or sentences and solve and vice versa. (Example: Juan has 12 kittens. Five are gray and the others are white. How many are white?)

C5. Translate comparison subtraction situations involving whole numbers into number expressions or sentences and solve and vice versa. (Example: If Jo weighs 78 lb now and weighed 87 lb six months ago, how much weight has she gained or lost?)

C6. Translate two-step situations involving the use of any combination of putting togethers, add-ons, take-aways, and comparisons into number expressions or sentences and solve and vice versa.

C7. Solve part-of problems involving unit fractions. (Example: One-third of the students in the class are girls. If there are 15 students, how many girls are there?)

C8. Translate appropriate English phrases for addition and subtraction into symbols and vice versa.

D1. Order whole numbers which have up to 4 digits.

D2. Order fractions which have a numerator of 1.

E1. Apply the commutative property in addition and multiplication of whole numbers.

E2. Apply the associative property in addition of whole numbers.

E3. Apply the identity property of 0 in addition and subtraction of whole numbers.

E4. Apply the identity property of 1 in multiplication and division of whole numbers.

E5. Write subtraction facts related to a given addition fact involving whole numbers and vice versa.

E6. Write division facts related to a given multiplication fact involving whole numbers and vice versa.

E7. Use related facts to check computations involving whole numbers. (Example: Use addition to check subtraction.)

G1. Identify the first 10 multiples of any number from 1 to 10. (Example: Count by 7's to 70.)

G2. Identify whole numbers as even or odd.

H1. Determine whether items can be bought for a given amount less than $10.00.

I1. Identify pairs of numbers that will produce a given sum or difference.

I2. Identify the missing term in an increasing or decreasing sequence of whole numbers with a common difference. (Example: Fill in the blank in 3, 8, ___, 18, . . .)

MATHEMATICS
GRADE 6

STATE GOAL FOR LEARNING 1

As a result of their schooling, students will be able to perform the computations of addition, subtraction, multiplication, and division using whole numbers, integers, fractions, and decimals.

SAMPLE LEARNING OBJECTIVES FOR GOAL 1

By the end of GRADE 6, students should be able to:

A1. Know the value of any digit in a decimal number up to thousandths.

A2. Write words for whole numbers up to 7 digits.

A3. Translate whole numbers from words to numerals up to 10 digits.

A4. Know fractions equal to a given fraction.

A5. Express fractions in lowest terms.

A6. Determine whether two fractions are equal.

A7. Know decimals equivalent to a given decimal. (Example: 1.5 = 1.50)

A8. Translate a decimal from symbols to words and vice versa.

A9. Write terminating decimals as fractions and vice versa.

A10. Write percents between 1% and 100% as decimals or simple fractions.

A11. Write improper fractions as mixed numbers and vice versa.

A12. Relate fractions, decimals and integers to points on a number line and vice versa.

B1. Add and subtract whole numbers with and without a calculator.

B2. Multiply a 3-digit number by a 2-digit number without a calculator.

B3. Add and subtract mentally single-digit multiples of powers of 10, less than 10,000.

B4. Divide any whole number by a factor with one significant digit without a calculator. (Example: Divide 4,320 by 60.)

B5. Divide a two- or three-digit number by a two-digit factor without a calculator.

B6. Identify a quotient and remainder when a whole number is divided by a one-digit whole number.

B7. Divide whole numbers with up to six digits in the dividend using a calculator.

B8. Add and subtract decimals of up to five digits without a calculator.

B9. Multiply any decimal by another decimal which has at most two significant digits, without a calculator.

B10. Divide any decimal by a one-digit whole number without a calculator.

B11. Multiply any two decimals using a calculator.

B12. Divide any decimal by another decimal using a calculator.

B13. Compute a fractional part of a whole number that is a multiple of the denominator. (Example: 4/5 of 35.)

B14. Add, subtract, and multiply fractions.

B15. Divide any decimal by another decimal with one significant digit without a calculator.

C1. Translate putting-together addition situations involving decimals or fractions into number expressions or sentences and solve and vice versa.

C2. Translate add-on addition situations involving decimals or fractions into number expressions or sentences and solve and vice versa.

C3. Translate take-away subtraction situations involving decimals or fractions into number expressions or sentences and solve and vice versa.

C4. Translate part-part-whole situations involving decimals or fractions into number expressions or sentences and solve and vice versa. (Example: The total length of two boards is 1.35 m. If the length of one board is 0.4 m, what is the length of the other?)

C5. Translate comparison subtraction situations involving decimals or fractions into number expressions or sentences and solve and vice versa.

C6. Translate array multiplication situations into number expressions or sentences and solve and vice versa. (Example: If there are 8 rows and 9 columns of dots, how many dots are there all together?)

C7. Translate repeated addition situations into number expressions or sentences and solve and vice versa. (Example: If postage costs 22 cents for the first ounce and 17 cents for each ounce afterward, how much will it cost to mail a 5-ounce letter?)

C8. Translate splitting-up division situations into number expressions or sentences and solve and vice versa. (Example: If a dozen eggs are equally split among 6 cakes, how many eggs are there in each cake?)

C9. Translate splitting-up division situations, yielding a remainder, into number expressions or sentences, solve, and interpret the remainder. (Example: How many boxes are needed to pack 21 apples if the most each box can hold is 6 apples?)

C10. Translate "times-as-many" multiplication situations into number expressions or sentences and solve and vice versa. (Example: Four times as many football fans as baseball fans own season tickets. If 1500 baseball fans own season tickets, how may football fans own them?)

C11. Translate "part of" multiplication situations involving decimals or fractions into number expressions or sentences and solve and vice versa.

C12. Translate multiple-step situations involving the use of any combination of putting together, add-on, take-away, part-part-whole, comparison, array, repeated addition, splitting-up, times as many, and part of situations into number expressions or sentences and solve. (Example: If the class uses 1/4 of the $28 it made at the bake sale to pay for supplies, how much was profit?)

C13. Translate appropriate English phrases for multiplication and division into symbols and vice versa.

D1. Compare percents to simple fractions and decimals.

D2. Order fractions, decimals, and integers.

E1. Apply the commutative and associative properties of addition and multiplication of whole numbers, decimals and fractions to compute mentally or to simplify computation. (Example: To multiply 4 x 13 x 25, think 4 x 25 x 13 = 1300.)

E2. Apply the identity property of 0 in addition and subtraction of decimals and fractions.

E3. Apply the identity property of 1 in multiplication and division of decimals and fractions.

E4. Know the role and limitations of 0 in division.

E5. Write subtraction facts related to a given addition fact involving decimals or fractions and vice versa.

E6. Write division facts related to a given multiplication fact involving decimals or fractions and vice versa.

E7. Use related facts to check subtraction and division of fractions or decimals.

E8. Apply the distributive property to multiply a whole number by a mixed number.

F1. Multiply and divide whole numbers and decimals by 10, 100, 1000, and other positive powers of 10.

F2. Know the value of a number raised to the second or third power.

G1. Know the greatest common factor (divisor) of two given whole numbers.

G2. Know the least common multiple of two given whole numbers.

H1. Determine the best buy with and without a calculator. (Example: Which is the better value, 7 oz for 69¢ or 12 oz for 99¢?)

H2. Follow a given sequence of instructions involving arithmetic operations.

I1. Know pairs of numbers that will produce a given product or quotient.

I2. Identify the missing term in an increasing or decreasing sequence of fractions or decimals with a common difference.

MATHEMATICS
GRADE 8

STATE GOAL FOR LEARNING 1

As a result of their schooling, students will be able to perform the computations of addition, subtraction, multiplication, and division using whole numbers, integers, fractions, and decimals.

SAMPLE LEARNING OBJECTIVES FOR GOAL 1

By the end of GRADE 8, students should be able to:

A1. Express percents less than 1% or greater than 100% as decimals or simple fractions.

A2. Change whole numbers given in scientific notation to standard notation and vice versa.

A3. Change large quantities given as combinations of words and numbers to standard notation and vice versa. (Example: Express 2.1 billion as 2,100,000,000.)

B1. Divide any decimal by another decimal with one significant digit without a calculator.

B2. Divide fractions.

B3. Add and subtract integers.

B4. Multiply and divide integers with and without a calculator.

C1. Translate combinatorial multiplication situations into number sentences and solve and vice versa. (Example: With 5 pants and 7 shirts, how many different outfits does Kelly have?)

C2. Translate rate division situations into number sentences and solve and vice versa. (Example: If a person types 400 words in 9 minutes, about how many words are typed per minute?)

C3. Translate ratio division situations into number sentences and solve and vice versa. (Example: If the United States' population is 230 million and Canada's is about 23 million, how many times as many people live in the U.S.?)

C4. Translate addition situations involving positive and negative numbers into sentences and solve and vice versa. (Example: A gain of 5 points followed by a loss of 7 points followed by a gain of 3 points results in what net change?)

D1. Order numbers in sets containing fractions, decimals, and integers.

E1. Know the reciprocal of any integer, fraction, or decimal.

E2. Apply the distributive property to compute mentally or simplify computation. (Example: $43 \times 5 = (40 \times 5) + (3 \times 5) = 200 + 15 = 215$.)

F1. Multiply and divide by 0.1, 0.01, 0.001, and other negative powers of 10.

F2. Compare the square root of a whole number with another number. (Example: Which is larger 3.9 or the square root of 15?)

F3. Know the squares of all whole numbers from 0 to 12 and the square roots of the perfect squares from 0 to 144.

F4. Know small (single digit) integer powers of positive numbers with and without a calculator.

G1. Know whether a number is divisible by 2, 3, 4, 5, 6, 9, or 10.

G2. Know the prime factorization of a whole number less than 100.

G3. Know all the factors (divisors) of a given number less than 100.

H1. Understand a personal financial budget.

H2. Schedule and budget time.

H3. Adjust a recipe for different amounts.

H4. Read diagrams, flowcharts, and schematics.

I1. Give an instance of a number pattern described using words such as product, difference, sum, quotient, or ratio. (Example: Give an example of two numbers whose sum is greater than its product.)

MATHEMATICS
GRADE 10

STATE GOAL FOR LEARNING 1

As a result of their schooling, students will be able to perform the computations of addition, subtraction, multiplication, and division using whole numbers, integers, fractions, and decimals.

SAMPLE LEARNING OBJECTIVES FOR GOAL 1

By the end of GRADE 10, students should be able to:

A1. Express a number given in scientific notation in standard notation, and vice versa. (Example: $2.3 \times 10^{-4} = 0.00023$)

A2. Express a repeating decimal as a simple fraction.

B1. Know the whole number quotient and remainder resulting from the division of two whole numbers on a calculator.

F1. Apply the laws of exponents in computations involving powers of whole numbers, including 0 and 1st powers of any positive number.

F2. Know small (single digit) integer powers of negative numbers with or without a calculator.

F3. Multiply and divide numbers in scientific notation using laws of exponents.

H1. Balance a checkbook.

H2. Fill out tax forms when given appropriate information.

H3. Understand a statement from a financial institution.

I1. Know the missing term in a simple linear or quadratic sequence of integers.

I2. Know a rule by which the terms in a simple linear or quadratic sequence of integers may be obtained. (Example: A rule for 1, 4, 9, 16, 25 is that the nth term is n^2.)

I3. Know a counterexample to a given number pattern. (Example: In this pattern, each number is supposed to be 3 times the previous number. 4/3, 3, 12, 36, 108. Which number should be replaced to make the sequence correct?)

MATHEMATICS
GRADE 12

STATE GOAL FOR LEARNING 1

As a result of their schooling, students will be able to perform the computations of addition, subtraction, multiplication, and division using whole numbers, integers, fractions, and decimals.

SAMPLE LEARNING OBJECTIVES FOR GOAL 1

By the end of GRADE 12, students should be able to:

C1. Translate word problem situations to mathematical expressions or sentences.

C2. Solve word problem situations that have been translated into mathematical sentences.

D1. Order numbers.

E1. Apply properties of numbers and operations to compute mentally or simplify computations.

E2. Use computational and problem-solving skills in real-life situations with or without a calculator as appropriate.

F1. Use exponents, powers, and roots.

G1. Use factors and multiples.

H1. Evaluate financial packages.

H2. Understand government and other types of financial documents.

I1. Recognize and use number patterns.

MATHEMATICS
GRADE 3

STATE GOAL FOR LEARNING 2

As a result of their schooling, students will be able to understand and use ratios and percentages.

SAMPLE LEARNING OBJECTIVES FOR GOAL 2

By the end of GRADE 3, students should be able to:

Objectives for this State Goal for Learning may be more appropriate at other grade levels.

MATHEMATICS
GRADE 6

STATE GOAL FOR LEARNING 2

As a result of their schooling, students will be able to understand and use ratios and percentages.

SAMPLE LEARNING OBJECTIVES FOR GOAL 2

By the end of GRADE 6, students should be able to:

A1. Translate appropriate English phrases for ratios into symbols and vice versa.

A2. Translate appropriate pictures depicting ratio situations into symbols and vice versa.

A3. Know whether two ratios are equal.

A4. Know ratios equivalent to a given ratio.

A5. Write a ratio in lowest terms.

B1. Compute the missing term in a proportion.

D1. Write percents as fractions and decimals.

D2. Compare percents between 1% and 100% to simple fractions and decimals.

D3. Identify from a picture or a statement the percent of the total of a specified part.

MATHEMATICS
GRADE 8

STATE GOAL FOR LEARNING 2

As a result of their schooling, students will be able to understand and use ratios and percentages.

SAMPLE LEARNING OBJECTIVES FOR GOAL 2

By the end of GRADE 8, students should be able to:

B1. Set up proportions to correspond to appropriate English statements of relationships among quantities.

C1. Solve problems leading to proportions in arithmetic situations. (Example: If the ratio of boys to girls in a class is 4:5 and there are 20 boys, how many girls are there?)

C2. Write proportions involving corresponding lengths in similar figures.

E1. Know the third number when two of the three numbers in a percent situation is known.

E2. Solve problems involving discounts, sales tax, tips, and commissions.

E3. Solve problems involving simple interest.

MATHEMATICS
GRADE 10

STATE GOAL FOR LEARNING 2

As a result of their schooling, students will be able to understand and use ratios and percentages.

SAMPLE LEARNING OBJECTIVES FOR GOAL 2

By the end of GRADE 10, students should be able to:

B1. Write proportions equivalent to a given proportion.

C1. Solve problems leading to proportions involving area in similar figures.

C2. Solve problems leading to proportions involving volume or weight. (Example: If two stones are of the same materials and shape and one is three times the other in length, width and height, how will their weights compare?)

E1. Solve problems involving percent of increase, percent of decrease, mark-up, and inflation.

E2. Calculate compound interest using a calculator.

MATHEMATICS
GRADE 12

STATE GOAL FOR LEARNING 2

As a result of their schooling, students will be able to understand and use ratios and percentages.

SAMPLE LEARNING OBJECTIVES FOR GOAL 2

By the end of GRADE 12, students should be able to:

A1. Interpret ratios.

C1. Apply ratios and proportions in real-life situations.

C2. Use proportions to express situations involving direct and indirect variations.

D1. Interpret percents in various settings.

E1. Apply rates and percents in real-life situations.

MATHEMATICS
GRADE 3

STATE GOAL FOR LEARNING 3

As a result of their schooling, students will be able to make and use measurements, including those of area and volume.

SAMPLE LEARNING OBJECTIVES FOR GOAL 3

By the end of GRADE 3, students should be able to:

A1. Determine the length of an object or line segment using an appropriate non-standard unit. (Example: Find the length of an object using the length of a paper clip as the unit.)

A2. Measure lengths to the nearest centimeter or inch.

A3. Know the perimeters of shapes from lengths of sides.

A4. Know areas of figures drawn on square grids.

A5. Determine volume or capacity by counting, using appropriate units. (Example: Find a volume using wooden cubes.)

A6. Read time off a clock to the nearest minute.

A7. Read dials and scales.

A8. Determine weight or mass using a balance scale and appropriate units. (Example: Weigh an object using pennies as the unit.)

A9. Know an equivalent to any amount of money less than $10 using bills and coins.

B1. Estimate the length of an object using a given unit.

D1. Know common equivalents of all coins and bills up to $10.00.

D2. Make change for purchases less than $1.00.

D3. Relate closely associated units of time, including calendar units: seconds, minutes, hours, days, weeks, months, years. (Example: How many months are there in 1 year?)

MATHEMATICS
GRADE 6

STATE GOAL FOR LEARNING 3

As a result of their schooling, students will be able to make and use measurements, including those of area and volume.

SAMPLE LEARNING OBJECTIVES FOR GOAL 3

By the end of GRADE 6, students should be able to:

A1. Know appropriate standard units (metric or customary) for measuring length (including distance), weight or mass, volume or capacity and time.

A2. Measure lengths to the nearest millimeter or 1/8 inch.

A3. Measure angles to the nearest 5^{o} with a protractor.

A4. Determine the duration of an interval between two times on the same or adjacent days.

A5. Distinguish among situations that call for perimeter, area, or volume.

B1. Estimate the area or capacity or volume of given objects using non-standard and standard units.

B2. Estimate weight or mass of an object using non-standard and standard (metric or customary) units.

B3. Estimate the distance between two points using appropriate standard (metric or customary) units of length.

C1. Distinguish among perimeter, area and volume.

C2. Apply the formulas which relate lengths and areas in rectangles and squares.

D1. Make change for purchases less than $10.00.

D2. Convert lengths within the metric system.

D3. Convert lengths (inches, feet, yards, miles) and weights (ounces, pounds) within the customary system.

E1. Add and subtract measures in compatible units. (Example: Add 4 feet 9 inches to 3 feet 7 inches.)

E2. Use a thermometer.

MATHEMATICS
GRADE 8

STATE GOAL FOR LEARNING 3

As a result of their schooling, students will be able to make and use measurements, including those of area and volume.

SAMPLE LEARNING OBJECTIVES FOR GOAL 3

By the end of GRADE 8, students should be able to:

B1. Estimate areas of irregular figures using a square grid.

C1. Relate lengths, areas, and volumes in boxes and cubes. (Example: Given two dimensions and the volume of a box, find the third dimension.)

C2. Relate lengths and areas in parallelograms.

C3. Relate lengths and areas in triangles.

C4. Relate the radius or diameter, area, and circumference in a circle.

D1. Convert masses and capacities within the metric system.

D2. Convert capacities (pints, quarts, gallons) within the customary system.

D3. Convert weights (ounces, pounds, tons) in the customary system.

D4. Convert square and cubic units within a system. (Example: How many cubic feet in a cubic yard?)

E1. Multiply or divide a given measure by a small whole number or small compatible unit. (Example: If 4 boards of equal length have a total length of 1.6 meters, how many centimeters long is each board?)

MATHEMATICS
GRADE 10

STATE GOAL FOR LEARNING 3

As a result of their schooling, students will be able to make and use measurements, including those of area and volume.

SAMPLE LEARNING OBJECTIVES FOR GOAL 3

By the end of GRADE 10, students should be able to:

B1. Estimate unknown lengths in a figure (two- or three-dimensional) using geometric relationships and principles.

C1. Find areas and volumes of figures resulting from combining common geometric figures. (Example: Find the area left after a circle is removed from a rectangle.)

C2. Apply given formulas to find surface areas and volumes in cylinders, prisms and spheres.

C3. Determine the effects on its area or volume of changing one dimension of a figure. (Example: How is the volume of a cone affected when its height is doubled?)

D1. Convert square and cubic units within a system. (Example: How many cubic feet are in a cubic yard?)

D2. Convert from one unit to another when given a conversion rule. (Example: Convert dollars to pesos or miles per hour to feet per second when given an appropriate conversion rule.)

E1. Perform operations with measures. (Example: If a 100-watt bulb is left burning for 48 hours, about how many kilowatt-hours of energy have been used?)

E2. Use latitude and longitude measures to locate points on the globe and vice versa.

E3. Relate latitude to length of days at different places on earth and at various times of the year.

E4. Relate longitude to time zones.

STATE GOAL FOR LEARNING 3

As a result of their schooling, students will be able to make and use measurements, including those of area and volume.

SAMPLE LEARNING OBJECTIVES FOR GOAL 3

By the end of GRADE 12, students should be able to:

A1. Measure in a variety of contexts using appropriate units.

B1. Estimate volume or capacity of irregular shapes.

D1. Compare units within a system and between systems, including non-geometric systems.

E1. Understand measurement systems, instruments and techniques.

MATHEMATICS
GRADE 3

STATE GOAL FOR LEARNING 4

As a result of their schooling, students will be able to identify, analyze and solve problems using algebraic equations, inequalities, functions and their graphs.

SAMPLE LEARNING OBJECTIVES FOR GOAL 4

By the end of GRADE 3, students should be able to:

B1. Solve addition and subtraction number sentences (equations) involving basic facts.

B2. Use the correct symbol for greater than, less than, equal to, and not equal to, to complete number sentences involving whole numbers.

B3. Identify missing numbers in sentences illustrating the commutative property.

C1. Translate English phrases into addition or subtraction expressions. (Example: "3 less than 10")

C2. Write number sentences for a situation involving addition or subtraction.

STATE GOAL FOR LEARNING 4

As a result of their schooling, students will be able to identify, analyze and solve problems using algebraic equations, inequalities, functions and their graphs.

SAMPLE LEARNING OBJECTIVES FOR GOAL 4

By the end of GRADE 6, students should be able to:

B1. Solve one-step addition or subtraction equations involving whole numbers.

B2. Solve multiplication and division equations involving basic facts.

B3. Select the solution to a linear sentence from a choice of whole numbers.

B4. Use the correct symbol for greater than, less than, equal to, and not equal to, to complete number sentences involving fractions.

B5. Use the correct symbol for greater than, less than, equal to, and not equal to, to complete number sentences involving decimals.

B6. Identify missing numbers in sentences illustrating associative and distributive properties.

C1. Write an equation for a situation involving multiplication or division.

D1. Evaluate formulas and expressions involving the four fundamental operations when whole numbers are substituted for variables. (Example: Find the value of 2L + 2W when L is 15 and W is 8.)

E1. Plot pairs of integers on a coordinate plane.

E2. Draw a graph when given a table of ordered pairs.

F1. Apply the rules for order of operations to evaluate expressions involving addition, subtraction, multiplication, or division of whole numbers.

MATHEMATICS
GRADE 8

STATE GOAL FOR LEARNING 4

As a result of their schooling, students will be able to identify, analyze and solve problems using algebraic equations, inequalities, functions and their graphs.

SAMPLE LEARNING OBJECTIVES FOR GOAL 4

By the end of GRADE 8, students should be able to:

A1. Use variables to describe a pattern involving numbers and operations. (Example: $2 + 3 = 3 + 2$ and $1/2 + 1/3 = 1/3 + 1/2$ are described by $a + b = b + a$.)

B1. Identify missing numbers in expressions involving identity or inverse elements.

B2. Solve one-step equations.

B3. Solve two-step equations involving integers. (Example: Solve $3x + 14 = 47$.)

B4. Know whether or not a number is a solution to an inequality.

B5. Identify missing numbers in sentences illustrating the distributive property.

C1. Translate an algebraic expression into an English phrase. (Example: $2x - 5$ can be translated into "twice a number less 5.)

C2. Identify an English statement that represents a given equation or inequality.

C3. Write an algebraic expression for an English phrase involving operations of arithmetic. (Example: Write "$n + 5$" for "a number increased by 5.")

C4. Write an equation or inequality for an English statement involving numbers.

D1. Evaluate expressions involving the four fundamental operations when fractions, decimals, and integers are substituted for variables.

D2. Solve for a variable in a simple formula when given values for all other variables.

D3. Use values from a real situation for the variables in a formula and solve.

D4. Apply formulas involving squares and cubes with and without calculators.

D5. Apply formulas involving square roots with and without calculators.

E1. Write an inequality that describes a graph on a number line.

E2. Graph a line when given a simple equation for it.

F1. Apply the rules for order of operation to evaluate expressions involving fractions or decimals.

F2. Add and subtract linear expressions involving variables.

F3. Apply the distributive property to multiply expressions involving variables.

G1. Make a table of values for a linear function or other simple function.

MATHEMATICS
GRADE 10

STATE GOAL FOR LEARNING 4

As a result of their schooling, students will be able to identify, analyze and solve problems using algebraic equations, inequalities, functions and their graphs.

SAMPLE LEARNING OBJECTIVES FOR GOAL 4

By the end of GRADE 10, students should be able to:

A1. Compare different powers of the same number or the same power of different numbers.

B1. Solve linear equations.

B2. Solve one-step inequalities.

B3. Know all real numbers whose square is a given number. (Example: Find x when $x^2 = 16$)

B4. Test solutions to systems of equations.

C1. Interpret solutions to an equation or inequality in terms of the situation they represent.

D1. Judge the appropriateness of particular values for a variable in a formula.

D2. Know equivalent forms of a formula. (Example: d = rt is equivalent to r = d/t.)

D3. Know a rule by which the next term in a sequence may be obtained. (Example: In a sequence 3, 5, 8, 13, ..., each term is the sum of the two preceding terms.)

E1. Know the slope determined by two points.

E2. Identify the solutions to a system of equations from a graph.

E3. Graph the solution of a simple inequality on a number line.

F1. Apply the rules for order of operations to evaluate expressions involving integers and powers.

F2. Add and subtract polynomials.

F3. Factor common monomial factors out of algebraic expressions.

F4. Multiply binomials.

G1. Make a table of values for a simple polynomial function.

G2. Determine values in a sequence when given a formula for the next term.

G3. Graph a simple function given its equation or other rule.

G4. Interpret rates of change from the graph of a function. (Example: Given a graph of the population of Illinois over time, in which time period did it increase the most?)

G5. Determine from a graph when a function has a given value.

G6. Read maximum and minimum values of a function from its graph.

G7. Compare values of two or more functions from a graph or table.

MATHEMATICS
GRADE 12

STATE GOAL FOR LEARNING 4

As a result of their schooling, students will be able to identify, analyze and solve problems using algebraic equations, inequalities, functions and their graphs.

SAMPLE LEARNING OBJECTIVES FOR GOAL 4

By the end of GRADE 12, students should be able to:

B1. Solve equations and inequalities found in everyday life.

B2. Write an equation for a line when given its graph.

B3. Interpret solutions of equations and inequalities.

D1. Apply formulas with and without calculators.

E1. Analyze graphs.

E2. Solve a simple system of equations in two variables using graphing, algebraic techniques, or technology.

F1. Factor special products including difference of squares and perfect square trinomials in one variable.

F2. Apply properties of exponents.

G1. Interpret functions and their graphs.

G2. Write an equation for a linear function, given a table of values.

G3. Understand function terminology.

STATE GOAL FOR LEARNING 5

As a result of their schooling, students will be able to understand and apply geometric concepts and relations in a variety of forms.

SAMPLE LEARNING OBJECTIVES FOR GOAL 5

By the end of GRADE 3, students should be able to:

A1. Sketch circles, squares, triangles, and rectangles.

A2. Identify cubes, spheres, cylinders, cones, and pyramids.

A3. Count the number of vertices and sides of plane figures and the number of faces, edges, and vertices of simple solids.

A4. Know the polygons with 3, 4, 5, 6, and 8 sides.

B1. Identify figures that have lines of symmetry.

B2. Draw symmetry lines in figures that have them.

C1. Identify congruent figures.

MATHEMATICS
GRADE 6

STATE GOAL FOR LEARNING 5

As a result of their schooling, students will be able to understand and apply geometric concepts and relations in a variety of forms.

SAMPLE LEARNING OBJECTIVES FOR GOAL 5

By the end of GRADE 6, students should be able to:

A1. Determine which of several two-dimensional figures possess a given characteristic. (Example: Which figure has sides that are parallel?)

A2. Determine which of several three-dimensional figures possess a given characteristic. (Example: Which figure has six faces?)

A3. Identify the vertex and sides of an angle.

A4. Determine whether an angle is right, acute, or obtuse.

A5. Identify perpendicular and parallel lines.

A6. Draw cubes and boxes.

B1. Identify angles of equal measure and sides of equal length in a symmetric figure.

C1. Cover a part of a plane using repetitions of a given pattern.

C2. Determine measures of angles and lengths of sides in congruent figures.

C3. Identify similar figures.

E1. Identify and describe properties of isosceles and equilateral triangles.

E2. Identify and describe chords, radii, and diameters of circles.

MATHEMATICS
GRADE 8

STATE GOAL FOR LEARNING 5

As a result of their schooling, students will be able to understand and apply geometric concepts and relations in a variety of forms.

SAMPLE LEARNING OBJECTIVES FOR GOAL 5

By the end of GRADE 8, students should be able to:

A1. Identify views of three-dimensional objects as seen from different locations.

A2. Identify relations in three-dimensional objects from two-dimensional patterns by relating their edges and faces. (Example: Identify adjacent faces for a cube from a two-dimensional pattern which can be folded into a cube.)

A3. Relate the numbers of sides and the sums of angle measures in triangles and quadrilaterals.

A4. Know relationships between and among adjacent, vertical, supplementary and complementary angles.

A5. Apply relationships among angles formed by parallel lines and another line crossing the parallel lines to determine unknown angles.

A6. Construct with ruler and compass congruent segments, perpendicular lines, perpendicular bisectors, and parallel lines.

B1. Sketch the reflection image of a figure over a line.

B2. Draw a figure similar to a given figure using coordinates.

B3. Slide (translate) a figure in the plane using coordinates.

C1. Determine measures of angles and lengths of sides in similar figures.

C2. Apply properties of similar figures to scale drawings and models.

D1. Apply the Pythagorean Theorem to determine the lengths of sides in a right triangle.

D2. Know the coordinates of the midpoint of a segment graphed on a number line.

STATE GOAL FOR LEARNING 5

As a result of their schooling, students will be able to understand and apply geometric concepts and relations in a variety of forms.

SAMPLE LEARNING OBJECTIVES FOR GOAL 5

By the end of GRADE 10, students should be able to:

A1. Relate the numbers of sides and the sums of angle measures in polygons.

A2. Sketch spheres, cylinders, cones, pyramids and prisms.

A3. Identify perpendicular and parallel lines and planes in space.

A4. Apply relationships between and among adjacent, vertical, supplementary, and complementary angles.

B1. Identify the transformations which show that two plane figures are congruent. (Example: Select the correct transformation under which Figure A is the image of Figure B.)

B2. Rotate a figure a specified number of degrees around a given center. (Example: Rotate a triangle 90^{o} around one of its vertices.)

B3. Identify symmetry planes in three-dimensional figures.

B4. Identify the solid formed by rotating a plane figure about a line. (Example: Rotating a right triangle about one of its legs will produce a cone.)

C1. Know an appropriate justification for the congruence or similarity of two triangles.

C2. Apply the relationships involving corresponding lengths, areas, and volumes of similar figures.

C3. Construct with ruler and compass congruent segments, congruent angles, and angle bisectors.

D1. Find the coordinates of the midpoint of a segment graphed on a line or in a plane.

D2. Determine the distance between two points on a coordinate graph.

D3. Relate sines, cosines, and tangents of angles to lengths of sides in right triangles.

D4. Find sines, cosines, and tangents of angles using a calculator.

E1. Identify and describe properties of the various types of quadrilaterals.

E2. Show that a conjecture is false by using a counterexample.

E3. Classify polygons by their properties. (Example: Which quadrilaterals have 2 pair of parallel sides?)

E4. Relate the measures of central angles, inscribed angles, and arcs in circles.

E5. Determine whether a geometric relationship observed in a given figure is common to all figures of the type or is unique to the figure at hand.

E6. Recognize when the conditions of a definition are met.

E7. Recognize and explain flaws in invalid arguments. (Example: From a statement, one should not deduce its converse.)

E8. Determine when a given condition is necessary, sufficient, or both.

MATHEMATICS
GRADE 12

STATE GOAL FOR LEARNING 5

As a result of their schooling, students will be able to understand and apply geometric concepts and relations in a variety of forms.

SAMPLE LEARNING OBJECTIVES FOR GOAL 5

By the end of GRADE 12, students should be able to:

A1. Understand simple geometric figures and patterns of relationships in two- and three-dimensions.

A2. Understand visual perceptions in geometry (perspective, optical illusions, tesselations, tiling, topology).

A3. Sketch simple 3-dimensional figures.

B1. Apply symmetry and transformation.

C1. Understand the concepts of congruence and similarity.

D1. Apply ratios of sides in similar right triangles to determine missing lengths of sides using a calculator.

E1. Know relationships in and between common geometric figures.

E2. Evaluate geometric arguments.

E4. Apply properties of triangles to gain information about two- and three-dimensional figures.

E5. Apply properties of various types of quadrilaterals to gain information about two- and three-dimensional figures.

MATHEMATICS
GRADE 3

STATE GOAL FOR LEARNING 6

As a result of their schooling, students will be able to understand and use methods of data collection and analysis, including tables, charts and comparisons.

SAMPLE LEARNING OBJECTIVES FOR GOAL 6

By the end of GRADE 3, students should be able to:

A1. Collect, record, and interpret simple real-world information. (Example: Ask students to name their birthday month, then write down the results.)

A2. Collect and record data from an experiment with coins, dice, or spinners.

D1. Know the possible outcomes of various situations.

E1. Read information from a picture, bar, or line graph.

E2. Understand a schedule. (Example: Read a TV program guide.)

F1. Use tallies to record data.

F2. Summarize data in simple graphs and tables. (Example: Summarize data from a picture, bar, or line graph.)

F3. Collect and record observations over time. (Example: Record high and low temperatures each day for a period of time.)

MATHEMATICS
GRADE 6

STATE GOAL FOR LEARNING 6

As a result of their schooling, students will be able to understand and use methods of data collection and analysis, including tables, charts and comparisons.

SAMPLE LEARNING OBJECTIVES FOR GOAL 6

By the end of GRADE 6, students should be able to:

A1. Organize data from an experiment into a frequency, bar, or broken-line graph.

B1. Compute relative frequencies of events when given data. (Example: If 4 of 20 people polled prefer candidate A, then the relative frequency of candidate A being preferred was 1/5 or 20%.)

B2. Recognize that probabilities and relative frequencies are between 0 and 1, inclusive.

C1. Predict most likely, equally likely, and least likely outcomes of an experiment.

D1. Know the probability that an event does not occur, given the probability of its occurrence.

E1. Make inferences from information given in tables, charts, and graphs.

E2. Compare two groups of data from graphs or tables.

E3. Interpret a circle graph.

E4. Interpret a transportation schedule. (Example: From a train schedule determine whether a ball game can be reached in time.)

F1. Organize data in rank order.

F2. Construct a bar graph.

G1. Know the median, mean, and mode of a set of data.

G2. Know the maximum, minimum, and range of a set of data.

STATE GOAL FOR LEARNING 6

As a result of their schooling, students will be able to understand and use methods of data collection and analysis, including tables, charts and comparisons.

SAMPLE LEARNING OBJECTIVES FOR GOAL 6

By the end of GRADE 8, students should be able to:

A1. Interpret a frequency, bar, broken-line, or circle graph.

B1. Express probabilities as percents, decimals, or fractions.

C1. Extend information obtained from a sample to a larger group.

D1. Compute the number of possible outcomes of a simple experiment.

D2. Compute the probabilities of events as the ratio of successes to tries.

D3. Identify situations which have probabilities close to 0 or 1.

E1. Use a circle graph to make predictions.

E2. Identify trends from scattergrams or coordinate graphs.

F1. Construct a graph showing the spread in a given set of data with or without a computer.

F2. Make a coordinate graph of data involving two variables with or without a computer.

G1. Compute percentiles in a set of data.

MATHEMATICS
GRADE 10

STATE GOAL FOR LEARNING 6

As a result of their schooling, students will be able to understand and use methods of data collection and analysis, including tables, charts and comparisons.

SAMPLE LEARNING OBJECTIVES FOR GOAL 6

By the end of GRADE 10, students should be able to:

A1. Compare relative frequencies from an experiment with theoretical probabilities. (Example: Is getting a sum of 7 four times in 25 tosses of two dice, more or less than would be expected by chance, assuming the dice are fair?)

B1. Estimate, based on experience, the probability of common everyday occurrences.

B2. Express the results of an experiment as odds. (Example: If 3 of 4 people have brown eyes, the odds are 3 to 1 that a person has brown eyes.)

C1. Compute expected values from probabilities expressed as percents, decimals, or fractions.

D1. Compute the probabilities of events given a formula.

D2. Compute the probabilities of the occurrence of two or more independent events.

E1. Read and interpret statistical charts and tables. (Example: Interpret an actuarial table.)

E2. Interpret graphs depicting the probabilities of an event.

E3. Make reasonable inferences from graphical comparisons of data sets.

E4. Evaluate the accuracy of presentation of data in media sources.

E5. Interpret $\pm$ in the context of accuracy of polls. (Example: Interpret 52% $\pm$ 3%.)

E6. Interpret results of polls as found in media sources.

E7. Differentiate between a sample and a population.

E8. Identify reasons for having a sample.

E9. Distinguish random sample from other kinds of samples.

E10. Recognize valid reasoning based on surveys and samples. (Example: Fifty-one heads in 100 tosses of a coin does not imply that the coin is false.)

F1. Draw a line to fit data on a coordinate graph.

F2. Write an equation for a line fitting data on a coordinate graph.

F3. Construct a circle graph with or without a computer.

F4. Construct graphs comparing data from two groups with or without a computer. (Example: Side-by-side histograms or bar graph, two-line graphs, or plots indicating spreads.)

F5. Construct cumulative frequency graphs with or without computers.

F6. Understand what type of graphical display best illustrates a given set of data.

G1. Recognize how the median, mean, and range are affected by changes in extreme values.

G2. Know how statistics are changed after applying a common arithmetic operation to data. (Example: What happens to the mean of 7 numbers if 3 is added to each number?)

MATHEMATICS
GRADE 12

STATE GOAL FOR LEARNING 6

As a result of their schooling, students will be able to understand and use methods of data collection and analysis, including tables, charts and comparisons.

SAMPLE LEARNING OBJECTIVES FOR GOAL 6

By the end of GRADE 12, students should be able to:

A1. Analyze data from an experiment.

B1. Estimate probabilities from experiments or from data.

C1. Apply probabilities to predict or forecast results of experiments and events.

E1. Analyze tables, charts, arrays, schedules, experiments, and surveys reported in media sources.

E2. Understand information management.

G1. Analyze commonly used summary statistics.

H1. Design and conduct an experiment or survey using sampling.

I1. Design and conduct a simulation to gain information about a problem.

MATHEMATICS
GRADE 3

STATE GOAL FOR LEARNING 7

As a result of their schooling, students will be able to use mathematics skills to estimate, approximate, and predict outcomes and to judge reasonableness of results.

SAMPLE LEARNING OBJECTIVES FOR GOAL 7

By the end of GRADE 3, students should be able to:

A1. Round whole numbers less than 1000 to a specified place value. (Example: Round 47 to the nearest 10.)

C1. Know whether a given whole number is between two others.

E1. Know whether enough information is presented to arrive at a conclusion.

E2. Identify information that is irrelevant to a given question.

E3. Formulate a question from given information.

F1. Apply the words all, some, and exactly appropriately.

G1. Choose appropriate operations to use to arrive at the answer to a given question.

G2. Use trial-and-error (guess and check) as a problem-solving procedure.

H1. Estimate results of computations with whole numbers.

STATE GOAL FOR LEARNING 7

As a result of their schooling, students will be able to use mathematics skills to estimate, approximate, and predict outcomes and to judge reasonableness of results.

SAMPLE LEARNING OBJECTIVES FOR GOAL 7

By the end of GRADE 6, students should be able to:

A1. Round any whole number to a specified place value.

A2. Round any decimal to the nearest specified place value.

A3. Round any fraction to the nearest whole number.

B1. Identify trends or the absence of trends in quantities graphed or tabulated over time.

B2. Estimate intermediate values in data collected over time.

C1. Know whether a given fraction or decimal is between two given numbers.

D1. Recognize various reasons for estimating. (Example: There may be insufficient information for an exact value, or it may require too much time or cost to obtain an exact value.)

D2. Recognize the approximate nature of physical measurements.

E1. Know whether enough information is presented to arrive at a conclusion.

E2. Identify information that is irrelevant to a given question.

E3. Formulate a reasonable question from given information.

E4. Identify information that was used in arriving at a particular conclusion.

E5. Know information that would be sufficient to arrive at a particular conclusion.

F1. Apply the words and phrases each, at least, and at most appropriately.

G1. Know appropriate operations to use to arrive at the answer to a given question.

G2. Use trial-and-error as a problem-solving procedure.

G3. Use simpler numbers to solve or suggest a solution to a given problem.

G4. Use estimates of given numbers to estimate an answer to a given question. (Example: If a car uses 10.8 gallons of gas to travel 218 miles, its miles per gallon can be estimated by dividing 220 by 11.)

G5. Check whether a tentative answer to an arithmetic problem is correct.

H1. Multiply or divide by powers of ten to estimate answers to problems involving large or small numbers.

H2. Estimate the answers to decimal and fraction problems.

MATHEMATICS
GRADE 8

STATE GOAL FOR LEARNING 7

As a result of their schooling, students will be able to use mathematics skills to estimate, approximate, and predict outcomes and to judge reasonableness of results.

SAMPLE LEARNING OBJECTIVES FOR GOAL 7

By the end of GRADE 8, students should be able to:

A1. Determine what original values might have resulted in a given rounded value.

A2. Know how calculators round or truncate numbers.

A3. Estimate square roots of whole numbers to the nearest whole number without a calculator.

A4. Round any positive or negative number to the nearest integer value.

B1. Estimate past or future values when given values in a trend.

C1. Know the appropriate estimate for an answer to a problem. (Example: If given one significant digit in one factor, the answer cannot be trusted to more than one significant digit.)

C2. Express answers as intervals when the given information is so expressed. (Example: If the length of a rectangular room is between 30 and 35 m and the width is between 10 and 12 m, then what can be said about the area of the room?)

D1. Identify when information consists of estimates.

E1. Know whether enough information is presented to arrive at a conclusion.

E2. Identify information that is irrelevant to a given question.

E3. Formulate a reasonable question from given information.

E4. Identify information that was used in arriving at a particular conclusion.

E5. Know information that would suffice to reach a particular conclusion.

E6. Know an appropriate justification for a given conclusion.

F1. Apply the words and phrases for all, such that, and, or, and not appropriately.

G1. Know appropriate operations to use to arrive at the answer to a given question.

G2. Use trial-and-error as a problem-solving procedure.

G3. Use simpler numbers to solve or suggest a solution to a given problem.

G4. Use estimates of given numbers to estimate an answer to a given question. (Example: If a car uses 10.8 gallons of gas to travel 218 miles, its miles per gallon can be estimated by dividing 220 by 11.)

G5. Check whether a tentative answer to an arithmetic problem is correct.

MATHEMATICS
GRADE 10

STATE GOAL FOR LEARNING 7

As a result of their schooling, students will be able to use mathematics skills to estimate, approximate, and predict outcomes and to judge reasonableness of results.

SAMPLE LEARNING OBJECTIVES FOR GOAL 7

By the end of GRADE 10, students should be able to:

B1. Recognize an appropriate equation, given a graph of values over time, describing the relationship over time and use that equation to estimate values not given.

C1. Identify intervals using variables and symbols of inequality.

C2. Relate the symbol $\pm$ as used to indicate precision. (Example: What are the largest and smallest values in the interval described by $1.52 \pm .005$?)

D1. Identify effects of a poor estimate.

E1. Know whether enough information is presented to arrive at a conclusion.

E2. Identify information that is irrelevant to a given question.

E3. Formulate a reasonable question from given information.

E4. Identify information that was used in arriving at a particular conclusion.

E5. Know information that would suffice to reach a particular conclusion.

E6. Know an appropriate justification for a given conclusion.

F1. Apply the conditionals if, if and only if, only if, and if-then appropriately.

G1. Know appropriate operation to use to arrive at the answer to a given question.

G2. Use trial-and-error as a problem-solving procedure.

G1. Use simpler numbers to solve or suggest a solution to a given problem.

G4. Use estimates of given numbers to estimate an answer to a given question. (Example: If a car uses 10.8 gallons in traveling 218 miles, its miles per gallon can be estimated by dividing 220 by 11.)

G5. Check whether a tentative answer to an arithmetic problem is correct.

G6. Use successive approximations to come closer to the answer to a question.

H1. Estimate solutions to equations. (Example: An estimate to the solution of $4.01 x = 28$ is 7.)

MATHEMATICS
GRADE 12

STATE GOAL FOR LEARNING 7

As a result of their schooling, students will be able to use mathematics skills to estimate, approximate, and predict outcomes and to judge reasonableness of results.

SAMPLE LEARNING OBJECTIVES FOR GOAL 7

By the end of GRADE 12, students should be able to:

B1. Estimate present and future values from graphs or numerical information.

C1. Apply intervals as estimates.

D1. Determine whether an estimate is a better alternative than an exact value.

E1. Evaluate conclusions from a given set of information.

E2. Understand deductive reasoning.

F1. Apply words of quantification appropriately.

G1. Apply problem-solving procedures to solve or suggest a solution to a given problem.

H1. Use mental arithmetic to estimate results of computations.

APPENDIX A

STATE GOALS FOR LEARNING--SIX AREAS OF LEARNING

LANGUAGE ARTS

The skills and knowledge of the language arts are essential for student success in virtually all areas of the curriculum. They are also central requirements for the development of clear expression and critical thinking. The language arts include the study of literature and the development of skills in reading, writing, speaking, and listening.

As a result of their schooling, students will be able to:

- read, comprehend, interpret, evaluate and use written material;
- listen critically and analytically;
- write standard English in a grammatical, well-organized and coherent manner for a variety of purposes;
- use spoken language effectively in formal and informal situations to communicate ideas and information and to ask and answer questions;
- understand the various forms of significant literature representative of different cultures, eras, and ideas;
- understand how and why language functions and evolves.

MATHEMATICS

Mathematics provides essential problem-solving tools applicable to a range of scientific disciplines, business and everyday situations. Mathematics is the language of quantification and logic; its elements are symbols, structures and shapes. It enables people to understand and use facts, definitions, and symbols in a coherent and systematic way in order to reason deductively and to solve problems.

As a result of their schooling, students will be able to:

- perform the computations of addition, subtraction, multiplication, and division using whole numbers, integers, fractions and decimals;
- understand and use ratios and percentages;
- make and use measurements, including those of area and volume;
- identify, analyze and solve problems using algebraic equations, inequalities, functions and their graphs;

- understand and apply geometric concepts and relations in a variety of forms;

- understand and use methods of data collection and analysis, including tables, charts and comparisons;

- use mathematical skills to estimate, approximate and predict outcomes and to judge reasonableness of results.

BIOLOGICAL AND PHYSICAL SCIENCES

Science is the quest for objective truth. It provides a conceptual framework for the understanding of natural phenomena and their causes and effects. The purposes of the study of science are to develop students who are scientifically literate, recognize that science is not value-free, are capable of making ethical judgments regarding science and social issues, and understand that technological growth is an outcome of the scientific enterprise.

As a result of their schooling, students will have a working knowledge of:

- the concepts and basic vocabulary of biological, physical and environmental sciences and their application to life and work in contemporary technological society;

- the social and environmental implications and limitations of technological development;

- the principles of scientific research and their application in simple research projects;

- the processes, techniques, methods, equipment and available technology of science.

SOCIAL SCIENCES

Social sciences provide students with an understanding of themselves and of society, prepare them for citizenship in a democracy, and give them the basics for understanding the complexities of the world community. Study of the humanities, of which social sciences are a part, is necessary in order to preserve the values of human dignity, justice and representative processes. Social sciences include anthropology, economics, geography, government, history, philosophy, political science, psychology and sociology.

As a result of their schooling, students will be able to:

- understand and analyze comparative political and economic systems, with an emphasis on the political and economic systems of the United States;

- understand and analyze events, trends, personalities, and movements shaping the history of the world, the United States and Illinois;

- demonstrate a knowledge of the basic concepts of the social sciences and how these help to interpret human behavior;

- demonstrate a knowledge of world geography with emphasis on that of the United States;

- apply the skills and knowledge gained in the social sciences to decision making in life situations.

FINE ARTS

The fine arts give students the means to express themselves creatively and to respond to the artistic expression of others. As a record of human experience, the fine arts provide distinctive ways of understanding society, history and nature. The study of fine arts includes visual art, music, drama and dance.

As a result of their schooling, students will be able to:

- understand the principal sensory, formal, technical and expressive qualities of each of the arts;

- identify processes and tools required to produce visual art, music, drama and dance;

- demonstrate the basic skills necessary to participate in the creation and/or performance of one of the arts;

- identify significant works in the arts from major historical periods and how they reflect societies, cultures and civilizations, past and present;

- describe the unique characteristics of each of the arts.

PHYSICAL DEVELOPMENT AND HEALTH

Effective human functioning depends upon optimum physical development and health. Education for physical development and health provides students with the knowledge and attitudes to achieve healthful living throughout their lives and to acquire physical fitness, coordination and leisure skills.

As a result of their schooling, students will be able to:

- understand the physical development, structure and functions of the human body;

- understand principles of nutrition, exercise, efficient management of emotional stress, positive self-concept development, drug use and abuse, and the prevention and treatment of illness;

- understand consumer health and safety, including environmental health;
- demonstrate basic skills and physical fitness necessary to participate in a variety of conditioning exercises or leisure activities such as sports and dance;
- plan a personal physical fitness and health program;
- perform a variety of complex motor activities;
- demonstrate a variety of basic life-saving activities.

APPENDIX B

LEARNING OBJECTIVES AND ASSESSMENT--QUESTIONS AND ANSWERS

Question: When will the first plan be due?

Answer: The first plan must be submitted by August 31, 1987.

Question: Can a district submit its plan earlier so that the objectives, assessment systems, and reporting procedures are approved prior to the beginning of the 1987-88 school year?

Answer: Yes. The State Board will be prepared to receive plans in the spring of 1987. Districts are encouraged to submit their plans as early as possible.

Question: What are the criteria for the approval of plans?

Answer: Specific criteria will be listed in rules currently being developed for this program. The criteria will be based on the legislative requirement that the local objectives meet or exceed the State Learning Goals, that the assessment procedures are adequate to determine the degree to which students are meeting these objectives, and that reporting procedures are sufficient to inform the public about the objectives, the assessment results, and the plans for improvement.

Question: What assistance is available to school districts?

Answer: Many forms of assistance are presently available and others are being developed:

1. The Illinois General Assembly appropriated $2.7 million in FY 86 and $2.55 million in FY 87 to assist local school districts in implementing this program. Each district may receive $1.31 per enrolled student this year by submitting an application for funds by October 15, 1986.

2. A final set of Sample Learning Objectives in each of the six fundamental areas of learning will be distributed in late September 1986; these will be based on revision of the Draft Model Learning Objectives in the six fundamental areas that were released in the spring of 1986.

3. An assessment item bank is being developed and test items from that bank will be available to districts in the fall of 1987.

4. Ten local school districts were funded in FY 86 as demonstration sites for development of model outcome/assessment systems and materials. Plans to continue and to expand this effort in FY 87 are under development.

5. Consultants to assist local school districts in the area of reading are available through the Educational Service Centers. Consultants in other areas will soon be available.

6. Workshops will be conducted and materials and publications will be distributed beginning this winter.

Question: How can a district receive assistance?

Answer: Districts should contact the Educational Service Center in their area. In addition, information and assistance regarding the development of objectives can be received from the Program Planning and Development Section or the Program Evaluation and Assessment Section, State Board of Education.

Question: Does a school district have to adopt the Sample Learning Objectives?

Answer: No. They are samples provided only to assist districts in the development of their local objectives.

Question: Why are there state test items?

Answer: In order to measure student learning against the state goals, the legislation requires that state test items be included in the local assessment system.

The General Assembly has indicated that it expects to receive information to help answer at least the following questions:

How does student performance in Illinois schools compare with statewide student performance?

To what extent are trends in achievement in each Learning Outcome area indicating decline, stability, or growth in performance over time?

Each of these questions will be studied by using the results of the state items for each grade and curricular area tested.

Question: How will the state testing items be developed?

Answer: Illinois teachers and other education professionals selected statewide will form committees that will help match test items to the state goals and construct the pilot tests. The items will be field-tested, statistically analyzed, and reviewed again by the committees.

Question: What will the relationship between state assessment items and the Sample Learning Objectives be?

Answer: There will be no direct relationship between the two. State assessment items will be based on the State Goals for Learning.

Question: Are Sample Learning Objectives the same as instructional objectives?

Answer: No. The Sample Learning Objectives define knowledge or skills at a school district, rather than a classroom, level. In that sense, they are more like school district learning goals than typical instructional objectives. In fact, they are called "objectives" in strict compliance with the language of the law. For all practical purposes they can be viewed as school district learning goals.

Question: Will the state testing items be available to the schools in advance?

Answer: The state testing items to be administered in any given year will not be available to schools for preview. However, sample items will be published for all student learning outcomes. These will be sent to all school districts prior to administration of state testing items in a curricular area. For example, a booklet of sample mathematics test items will be sent to districts prior to the administration of state mathematics testing items in spring of 1989. The booklet will contain sample items for all mathematics learning outcomes, keyed to the four grade levels to be tested (i.e., 3, 6, 8, and 10).

Question: To whom and how will state testing data be reported?

Answer: Each school will receive its students' mean scores in raw score units as well as the school's percentile rank in Illinois for each Learning Outcome area tested as well as comparisons by Learning Outcome area statewide.

Each school district will receive the above results for each of its schools as well as similar mean scores for the district as a whole.

The General Assembly and the Governor will receive a report from the State Board including:

- the state's average performance and range of achievement for each learning area tested in raw score units and percentiles;
- results of additional statistical analyses and interpretations, especially curricular strengths and weaknesses, trends and evidence of significant correlations; and
- national comparisons.